

## ABSTRACT OF THE INVENTION

An Optical Cross Connect Switch includes beam generating, beam directing, and beam receiving portions. The beam generating portion receives a number of optical fibers and creates a communication beam for each fiber and an un-modulated companion alignment beam corresponding to each communication beam. The communication beam and its corresponding alignment beam are spatially separated, substantially collimated beams, and are aligned to propagate away from the beam generating portion to the beam directing portion. The beam directing portion includes a first beam director and a second beam director, with each director having an array of beam-directing elements. Each communication beam and its corresponding alignment beam strikes a beam directing element on the first beam director, and are re-directed to a beam directing element on the second beam director. From the second beam director, the two beams propagate towards beam receiving portion with each beam striking a separate lenslet. One lenslet focusses the communications beam onto an output fiber, and another lenslet focusses the alignment beam onto a position sensor. The positional relationship between the communication beam and the alignment beam is known given any combination of beam directing elements in the first and second beam directors. As a result of this known relationship, the position

where the focussed alignment beam strikes the position sensor provides position information for the corresponding communication beam. Using the position information from the position sensor, the beam directing elements are finely adjusted to direct the focussed communication beam onto the end of an optical output fiber.

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